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AUTHOR	Boyd, Michael
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ABSTRACT

This on-going study explores the hypothesis that stock fund managers who underperform do so because they make bad decisions, and examines whether their choices can be improved by using a decision model that invokes principles of brain hemispheric consensus. The study, begun in fall 1999, involves two groups of business students: the control group consists of 17 undergraduate finance majors; the test group consists of 22 students enrolled in an off-campus executive Master of Business Administration program. All students completed a hemispheric consensus prediction (HCP) profile to determine brain hemispheric dominance. Each participant received an identical list of 20 stocks drawn from the Standard & Poors 500 index, as well as limited amounts of fundamental and technical information about each stock. Test-group students received a set of stock selection procedures built around Loye's decision model, a multi-step, brain hemispheric consensus-seeking decision-making technique; control-group students received more general instructions. Students were told to select a portfolio that would outperform the market over three to six months; they kept journals of their findings, observations, and thought processes, and their stocks were tracked. Preliminary results mildly support the use of hemispheric consensus in decision making for picking portfolio investments. The HCP profile is appended. (SM)

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Brain Hemispheric Consensus and the Quality of Investment Decisions

Michael Boyd
Professor of Finance
Stetson University
DeLand, FL 32720

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Phone: (904) 822-7377
Fax: (904) 822-7446
Email: mboyd@stetson.edu

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Brain Hemispheric Consensus and the Quality of Investment Decisions

Michael Boyd
Stetson University

This study began with a double-blind experiment in simulated stock portfolio selection, using real-time market information for the fourth quarter of 1999. The test group was a class of financial management students in an executive MBA program. They made their decisions using a multi-step brain hemispheric consensus-seeking technique. Control group members were undergraduate finance majors in a senior-level capital budgeting course. Participants' portfolios, valued on December 31, 1999, will be tracked over a one-year holding period. They will be monitored for dividends and stock splits, re-valued quarterly, and the outcomes reassessed. Early results of the study mildly support the use of hemispheric consensus in picking portfolio investments.

Introduction to the Problem

A major goal of business educators, as set forth in many a B-school mission statement, is to develop students' decision-making abilities. It is therefore reasonable to think that we should periodically ask ourselves: How well are we meeting this goal? In the areas of security analysis and portfolio management, the evidence is not very encouraging. During the ten-year period ending June 30, 1998, the annual return on an average general-equity mutual fund in the U.S. was 3.32 percentage points less than that of the unmanaged Standard & Poors 500 index (Malkiel, 1999). It is often reported in the press that in a given year, most managers fail to equal or exceed their funds' benchmark averages. Accounts range from 60 to over 90 percent, depending upon the year and the type of fund. Findings like these, which some regard as proof of the indeterminacy of stock prices, underlie the recent growth in popularity of index mutual funds. Similarly poor track records attach themselves to active pension fund management (Malkiel, 1999). Yet most large portfolios remain under active management, and the question of market efficiency (the efficient market hypothesis, or EMH) is far from being settled (e.g., see Haugen, 1995; Peters, 1996; and Lo and MacKinlay, 1999).

This study does not try to lengthen the EMH debate, but looks instead at the human cognitive side of the investment management issue. It explores the possibility that fund managers who underperform the market do so because they make bad decisions, and that their choices can be improved by using a decision model that invokes the principle of brain hemispheric consensus.

A Framework for Making Better Decisions

Psychologist and futurist David Loye suggests that a strategy in which right and left brain halves work together to support each other leads to improved predictions, and therefore

better decisions, in a variety of venues (Loye, 1998). Yet in numbers-rich, formula-driven disciplines such as finance, the kinds of decision skills we teach draw heavily on the left brain's "rational" analytical processes, with scant attention paid to the right brain's "intuitive" powers, or to models of hemispheric cooperation such as the one put forth by Loye. The purpose of this study is to test Loye's model in an investment setting.

Loye (1998) describes the essence of his brain interaction model as "consensus-dissensus analysis, or whether both brain halves agree or disagree on the projection of the future upon which (the) prediction will be based" (p. 171). He notes that while some people rely more on left-brain rationality and others on right-brain intuition, all of us *unwittingly* draw on both halves to make decisions. The key to making better predictions lies first in understanding which half of the decision maker's brain is dominant, and then in carrying out a hemispheric cooperation plan "consciously, and with clear purpose" (p. 172). This plan proceeds in five steps:

1. Relax in a quiet setting. Loye suggests the use of meditation or self-hypnosis to calm the busy left brain and allow the right brain to do the initial work.

2. Ask your right brain for an intuitive but non-binding decision on the question at hand. (The question should be phrased in "either/or" or "yes/no" terms: Will the market continue to rise over the next six months? Which stock, Dell or Compaq, is the better buy just now among computer makers? Are the dot.com companies overvalued?) This step should be carried out fairly quickly, with a minimum of activated rationality. It is a good idea to write down the decision.

3. Ask your left brain for a non-binding decision in light of a thorough analysis of all the available data. This step will naturally take longer than step 2, and may involve a listing of the issue's "pros" and "cons." Once again, record the decision.

4. Check to see if the decisions based on intuition and rationality support each other.

5. Make a final decision in light of step 4 and your knowledge of your own left- or right-brain orientation. If there is hemispheric consensus on the question, the choice is an unequivocal "yes" or "no." If the two halves conflict in either direction, the proper response is to delay or avoid the decision. If delay is not an option and a decision must be made, then defer to the wisdom of the brain's dominant side.

To determine brain dominance in test subjects, Loye uses the Hemispheric Consensus Prediction [HCP] Profile, which he developed for research at the Institute for Futures Forecasting (Loye, 1980). The HCP Profile questionnaire and its scoring instrument are shown in Appendices A and B, respectively.

Method of Inquiry

The introductory phase of this study, conducted during the fall semester of 1999, was a double-blind experiment involving two groups of business students enrolled in upper-

level financial management courses. One group comprised a day section of undergraduate finance majors, the other an off-campus executive MBA class meeting one night per week. While the finance majors might be expected to have had more exposure to formal investment education, the MBA students typically bring much more business experience to the table. Thus an interesting—and, as it turns out, critical—issue is the degree to which these two different types of credentials offset each other.

The study's ongoing agenda is as follows:

- Early in the semester, all participants were given the HCP Profile to determine their brain's hemispheric dominance, if any. Individual results were made known only to those who would make up the experiment's test group.

- Originally, each section was to have been divided into a test group and a control group of approximately equal size. An attempt was to be made within each section to keep the groups' composition comparable in terms of left- and right-brain orientation. At the last minute, I realized that this structure could not have been kept secret, that student curiosity soon would have compromised the double-blind nature of the experiment. To deal with this reality, I decided to let 60 miles of highway do what the best of intentions could not: I made the off-campus MBA section the test group and the on-campus finance majors the control group. (In making this delineation, I hoped of course that the graduate students' business experience would roughly offset the undergraduates' extra finance course exposure. I also knew that in a subsequent semester, I could test this presumption by repeating the experiment with the group assignments reversed.)

- Each participant was given an envelope containing an identical list of 20 stocks that was drawn from among those that make up the Standard & Poors 500 index. This sample constituted their "market." They also received a limited amount of fundamental and technical information about each of the 20 stocks, including their current market capitalizations. And they were told that their sole investment objective was to select from the list a portfolio of stocks that they thought would outperform the market, in terms of total return (i.e., the dividend yield plus the annualized rate of price change), over a three-to-six-month period. "Outperform" was defined to mean *either* higher returns in a rising or "bull" market *or* smaller losses in a "bear" market. This made it necessary for each participant to decide at the outset upon the probable direction of the market.

  Each portfolio had to contain at least five, but no more than 10, different stocks. Thus the question of "concentration vs. diversification" was another one with which each participant—within limits—had to grapple. To rule out "token" positions in any stock, a minimum size purchase was set at $8,000, and from an initial cash balance of $100,000, each student was required to spend at least $80,000. Buying on margin was not allowed. To further assure diversification, the 20 stocks in their mini-universe were drawn from 20 different industries. Online trading was assumed, with commissions set at $20 per transaction.

For those whose analysis led them to postpone any of their stock selections, investment in a money market fund was also allowed. However, once money was taken from this temporary asset and put into stocks, those decisions were frozen for the duration of the experiment. (Due to the students' narrow window of direct involvement in the project, all portfolios were restricted to a buy-and-hold strategy, with no subsequent trading permitted.)

- Test group members received a set of stock selection procedures built around Loye's decision model (without identifying the model as such). Control group members were given a more general set of instructions that were unconnected to Loye's model. Participants in both groups were advised that their individual instructions might differ from those of their classmates, and all signed a pledge to work independently.

- After a month of economic, market, and securities research, portfolio selection began on September 30. All portfolios were in place by October 18. Participants accounted for their stock purchases and subsequent dividends on a Microsoft® Excel® spreadsheet specifically designed for the study. Throughout the rest of the semester, the stocks were monitored for dividends and splits, and the inputs adjusted for the latter when necessary. All cash dividends posted to the spreadsheet are automatically reinvested in money market funds as of their payment dates. A similar spreadsheet kept track of the market capitalization-weighted, unmanaged 20-stock index. The companies that made up the index are shown in Table 1, along with their market caps on September 30, 1999. Included is a frequency distribution of the index stocks among the students' portfolios.

- For the project's initial phase, annualized returns on the portfolios and on the market index were computed for the fourth quarter of 1999. Statistical tests were conducted to see if the average returns of the test and control groups differ significantly from each other as well as from that of the 20-stock index. Multiple regression was also used to check for a relationship between individual returns and HCP scores. These tests are described and their results discussed later.

- Each participant was required to keep a journal detailing significant findings, observations, and thought processes as (s)he moved through the various stages of the experiment.

- As the project continues into the year 2000, the portfolios will be tracked and updated for dividends and stock splits. Total annualized returns will be recomputed for the six-, nine-, and 12-month periods ending respectively on March 31, June 30, and September 30. Extended results will then be compared with those from the shorter time horizons. The experiment's cumulative findings will be reported in future drafts of this paper.

Table 1: 20-Stock Index and Selection Frequencies

Company	Ticker Symbol	Industry	Market Cap[1] ($millions) Sept. 30, 1999	No. of Portfolios by Group Test	Control	Total
General Electric Co.	GE	Electrical Equipment	388.9	14	10	24
Wal-Mart Stores, Inc.	WMT	Retail-Gen. Mdse.	211.7	12	12	24
Exxon Mobil Corp.	XOM	Oil-International	184.5	5	5	10
Pfizer, Inc.	PFE	HC-Drugs-Major	139.0	14	8	22
America Online, Inc.	AOL	Internet Services	115.3	18	14	32
Home Depot, Inc.	HD	Retail-Bldg. Supply	101.8	17	9	26
Time Warner, Inc.	TWX	Entertainment	78.6	6	8	14
Ford Motor Co.	F	Automobiles	60.8	4	6	10
The Boeing Co.	BA	Aerospace/Defense	40.9	6	1	7
Anheuser-Busch Cos., Inc.	BUD	Beverages-Alcoholic	32.8	10	7	17
Merrill Lynch & Co., Inc.	MER	Investment Broker	24.9	7	4	11
Monsanto Co.	MTC	Chemicals-Diverse	22.6	4	2	6
SunTrust Banks, Inc.	STI	Banks-Major Regional	21.1	5	3	8
Southern Co.	SO	Electric Utility	17.6	1	4	5
The Quaker Oats Co.	OAT	Foods	8.2	1	3	4
Adobe Systems, Inc.	ADBE	Computer Software	6.9	13	10	23
Delta Air Lines, Inc.	DAL	Airlines	6.8	3	6	9
Avon Products, Inc.	AVP	Personal Care	6.5	2	3	5
Winn-Dixie Stores, Inc.	WIN	Retail-Food Chain	4.4	1	0	1
Homestake Mining Co.	HM	Gold Mines	2.4	2	7	9
		TOTALS	1,475.8	145	122	267

[1]Source: Baseline Financial Services

The Test Group

The test group consisted of 22 students enrolled in an executive MBA program at Walt Disney World in Lake Buena Vista, Florida. All of them work for Disney, either directly or as independent contractors. This group was evenly split in terms of gender. Members ranged in age from 22 to 41 years, with an average age of 30.41 ($\sigma = 4.65$). Their HCP Profile scores ran the gamut from 1.1 (extremely left-brain dominant) to 1.9, with an average of 1.46 ($\sigma = .20$).

The relaxation techniques recorded by the test group members in their journals were generally predictable but in some ways surprising. Most participants reported using more than one technique. Fully half of the group listed music. Two of these specified classical music, one said soft jazz, another wrote "calming." (The author of this last adjective, however, went on to provide a rather strange set of examples: Enya, Jimmy Buffett, and Pink Floyd!) One respondent specifically opted for *no* music, saying she needed absolute quiet in order to concentrate. Other proffered aural aids to relaxation were a CD of ocean sounds and a small gurgling fountain.

Another recurring relaxation theme was exercise, with nine citations. Eight of these specified a particular activity: a walk, a long walk (2), running (2), swimming, a long bike ride, and a long workout.

Three group members listed hot showers, baths, and bubble baths (one each). One prescribed hot tea, another herbal tea, still another a nice dinner and a margarita. Three opted for a dark room, while one specified a well-lit room. One respondent said her most effective relaxation trick was playing Tetris on her Game Boy™.

The Control Group

There were 17 students in the control group. All are undergraduate finance majors who were taking FIN 410 – Financial Management I. (There is quite a bit of similarity between this course and the MBA finance course taken by the test group. Both require the junior-level "Business Finance" course as a prerequisite. They are presented at about the same level of difficulty, though the undergraduate course covers less material in somewhat greater depth. Most importantly, both courses begin with a unit on risk and return, modern portfolio theory, and stock and bond valuation.)

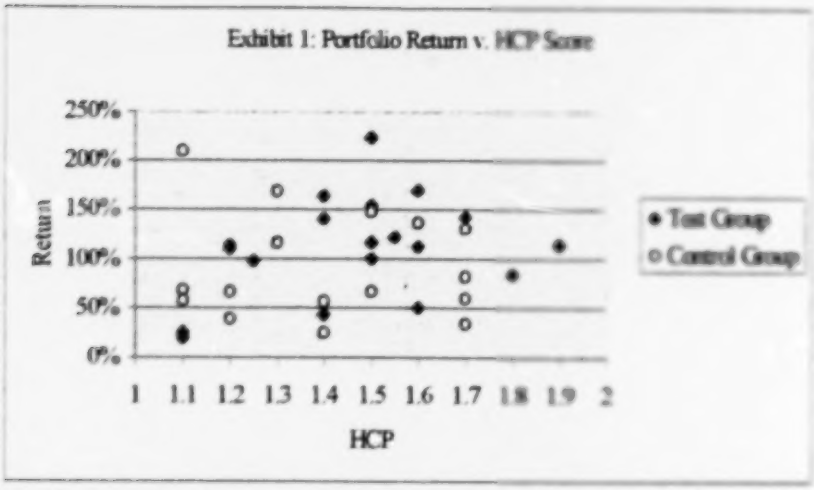
Ranging in age from 20 to 34 years, and with an average age of 22.24, the control group was some 27 percent younger than the test group. The dispersion of ages around this mean, however, was not markedly different from that of the MBA students ($\sigma = 4.08$). The range of HCP Profile scores was nearly as broad (1.1 to 1.7), and the distribution looks remarkably comparable ($\mu = 1.40$, $\sigma = .22$). Unlike the test group, which was 50 percent female, only four of the 17 members of the control group were women.

Market Data Sources

Some of the participants' portfolio research information came from the usual kinds of print media sources associated with well-stocked libraries (e.g. *The Wall Street Journal*, Standard & Poors publications, etc.). But arguably most of it came, in real time, from the daylong coverage of the markets on cable television channel CNBC and the Internet web sites of online brokerage houses and investment support services. (A number of students in both groups were already online investors at the outset of the experiment.)

Early Results of the Study

The test group's annualized portfolio returns for the fourth quarter of 1999 ranged from a high of 223.6 percent to a low of 19.8 percent. Even the lowest of these results would seem great by long-run historical standards. This study, however, had the good luck of starting in an amazingly strong stock market. The average annualized return for the test group was 115.8 percent ($\sigma = 48.8$ percent). The range of returns for the control group was similar (from 209.9 percent down to 25.0 percent), as was the standard deviation (50.7 percent). The control group's average return, however, was just 93.2 percent. (*Just 93.2 percent?* How strange does *that* sound?) Individual returns for both groups are plotted against HCP Profile scores in Exhibit 1.



An F-test was first used to determine that the two rate-of-return sample variances are equal to a fair degree of certainty ($F = 1.09$, $P = .41$). Then a t-test was performed to see if the test group's average return exceeds that of the control group by a significant margin, the null hypothesis being that it does not. The resulting t-statistic of 1.37 gives a one-tail P-value of .089. What these numbers suggest for the null hypothesis depends on whether the reader is a strict "five percenter" or a pragmatist. A P-value of just under .09 doesn't cry out for rejection of H_0. Neither, however, does it lend the null hypothesis much support. Something appears to be going on in the data. For the initial valuation period, Loye's decision technique seems to have some merit.

That's the good news. The bad news is that while the test group managed to outperform the control group over a three-month time horizon, it did not beat the unmanaged 20-stock index, which enjoyed an eye-popping annualized return of over 130 percent. This performance was heavily influenced by large-cap winners General Electric, Wal-Mart, America Online, and Home Depot, which accounted for more than 55 percent of the index's beginning market value. Many of the students' portfolios contain these stocks as well (see Table 1), which tends to make their first-quarter results relatively, if not always absolutely striking.

T-tests were conducted to see if either group's mean return differs significantly from that of the 20-stock index. A t-value of 1.365 shows no significant difference between the test group's 115.8 percent average and the market's 130.3 percent return (21 degrees of freedom, two-tail test). The control group's 93.2 percent return, however, differs from the market return at a .01 level of significance, as indicated by a t-value of 2.925 (16 d.f.).

While neither group beat the market on average, a higher proportion of the test group did so, and by a wider margin than the control group. Eight of the test group's 22 students (36.4 percent) enjoyed an average return of 164.63 percent, meaning they outperformed the index by more than 34 percentage points. Among the control group, five out of 17 (29.4 percent) averaged a 159.11 percent return, beating the index by about 29 percentage

points. Although these proportion and performance differences between groups both run in favor of the test group, neither turns out to be statistically significant. A Chi-square test fails to show that the proportion of test-group members who beat the index was significantly greater than the proportion of control-group members who did so ($\chi^2 = .65$, $P = .42$). And a t-test establishes the same conclusion with regard to higher-than-market-index portfolio returns ($t = .93$, $P = .37$). Viewed alongside the earlier finding of higher mean returns for the test group, these results imply that most of that group's strong overall performance is centered among those who did *not* beat the index.

Using Risk-Adjusted Returns

When the study participants were given their charge to try to outperform the 20-stock market index, no mention was made as to whether their results would be viewed in a risk-adjusted light. So there is no reason to think that they set out to maximize risk-adjusted excess returns. Out of curiosity, however, I repeated the t-test on the group averages for this variable. Risk-adjusted excess returns were computed in four steps: (1) Weighted average portfolio betas were determined from individual betas (stocks v. the S&P 500) obtained from Baseline Financial Services. (2) Portfolio betas were next divided by the 20-stock index's average beta of 1.15, to produce "relative" betas (with that of the index becoming 1.00). (3) Using the Capital Asset Pricing Model's security market line [SML] equation, relative betas were combined with the index's realized return of 130.31 percent and the U. S. Treasury long bond rate of 6.07 percent (as of September 30, 1999), to determine each portfolio's required rate of return. The SML equation is:

$$k_j = k_{RF} + (k_M - k_{RF})\beta_j ,$$

where k_j is a stock or portfolio's required return, k_{RF} the risk-free (Treasury bond) rate, k_M the return on the market portfolio, and β_j the stock or portfolio's beta. (4) Finally, required rates were subtracted from realized rates to produce risk-adjusted excess rates of return.

Since only one-third of all portfolios beat the index in this first three-month period, the average excess return for each group was negative. While the figure for the test group was *less* negative than that of the control group, the new t-statistic of .94 was also weaker than the original ($P = .18$). But since there was no *a priori* reason to expect stronger results in the risk-adjusted case, these findings are not especially disturbing.

Multiple-Regression Results

In an experiment involving several California institutions of higher education, Loye studied the forecasting ability of 135 test subjects in the areas of U. S. politics, economics, and foreign affairs (Loye, 1983). He found that people with centered HCP Profiles consistently made better outcome predictions than those with strong left- or right-brain orientations. Since financial markets are so clearly driven by economic forces, it seemed both natural and worthwhile in the present study to subject this idea to further testing, using multiple regression.

The test model says that a portfolio's rate of return is essentially a function of two variables, the portfolio's weighted average beta and the degree to which the decision maker's HCP Profile score deviates from the average of 1.5. The expected sign on the coefficient of the beta variable is positive, while that of the HCP deviation is negative. (This latter variable is computed as an absolute value: $|1.5 - \text{HCP score}|$, so it can account for deviations in either direction.)

The test can be conducted in either of two ways. One is to estimate the equation

$$k_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon_i$$

for each group, where k_i is the expected return on portfolio i, independent variables X_1 and X_2 are portfolio beta and HCP deviation, respectively, and ε_i is a random error term. The two equations' slope coefficients would then be tested for significant inter-group differences.

Another approach is to use the combined samples to estimate a single equation,

$$k_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon_i$$

where k_i, X_1, X_2 and ε_i are as defined above. X_3 is a dummy variable representing group membership (control group = 0, test group = 1). The expected sign of its coefficient is positive. X_4, an interaction term that equals the product of X_2 and X_3, isolates any difference that may exist in the impact of variable X_2 (HCP deviation) between groups. Its coefficient should carry a negative sign.

Qualitatively, the two regression alternatives yield similar results. Although both were used in this study, in the interest of brevity only the latter test is reported here. The equation estimated from the combined sample is

$$\hat{k} = -1.00 + 1.54X_1 + .81X_2 + .40X_3 - 1.70X_4$$

t-statistics:	-1.74	3.53	.94	1.62	-1.60	
P-values:	.09	.0006	.18	.06	.06	$R^2 = .40$

Since each of the four explanatory variables has an expected sign going into the test, one-tail P-values are reported for them. Not surprisingly, beta (X_1) turns out to be the strongest, with a positive sign, as expected, and an extremely low P-value. HCP deviation (X_2), for the combined sample, is of the wrong sign but insignificant. Group membership (X_3) has the expected positive sign and marginal significance. And the interaction variable (X_4), also of slight significance, is negative in sign. These last two results, taken together, suggest that any influence HCP score has on portfolio return is localized within the test group. (A negative X_4 is a reasonable presumption, even if the sign of X_2 were negative, since the test group was instructed in and focused on seeking hemispheric consensus. Members of that group with very high or low HCP scores were aware of their

particular numbers and the need to work their brains' weaker sides. Control group members operated without this knowledge.) At .40, the regression's coefficient of determination (R^2) is good in view of small sample sizes and the cross-sectional nature of the data. But much of it is due to the strong impact of beta on rate of return. On balance, the regression exercise furnishes only limited support for Loye's earlier tests.

Assessment of Overall Results

Earlier I wrote that this study " . . . explores the possibility that fund managers who *underperform the market* do so because they make bad decisions, and that their *choices can be improved* by using a decision model that invokes the principle of brain hemispheric consensus" (italics added). Overall the experiment seems to support the second part of this statement but not the first. That is, hemispheric consensus may lead to better stock selection, but not necessarily to the extent of outperforming an unmanaged index. Whether a longer holding period alters this conclusion will be examined in the months ahead.

It could also be the case that the study's lukewarm results were hampered by faulty methodology. Or they may actually have been improved by it—who knows? The point is that planning and conducting the experiment was as much a learning experience for me as participating in it was for my students. A number of unforeseen things happened—both within and beyond my control—that have caused me to wish I could start the project all over. The most problematic of these little reality checks are discussed in the next section.

Suggestions for Future Research

When I made the decision to separate the test and control groups by geography, I had reason to think that within a short period of time I would reverse the groups and replicate the experiment. Those intentions are now in doubt, for two reasons:

First, the MBA finance course, it turns out, will not be taught again at Disney World until the summer of 2001. And during that summer term, the senior undergraduate course will not be offered. I will teach an MBA class on campus this fall, but its audience will differ from those at Disney in that a large proportion will have had no significant business experience. This means that were I to rerun the experiment next semester, I would not be able to test the assumption of substitutability between business experience and extra finance coursework. To compound the problem, it is almost certain that some of the on-campus MBA students will be recent Stetson graduates with strong ties to the undergraduate population. This guarantees that the experiment, once started, could not remain double-blind for long.

Second, if I repeated the experiment, I would not conduct it exactly as before. Instead, with the aid of 20-20 hindsight, I'd make several important changes:

- I would delay starting it until midway through the semester, so the participants would have at the outset a better grasp of valuation and diversification concepts.

- I would try to simplify the test group procedures to ensure that right-brain intuitive choices made late in the experiment do not become tainted by earlier left-brain data processing. I don't know at the moment how I would accomplish this. But I do know it is a problem. One of the MBA students remarked in her journal that as the experiment wore on, she found it harder to relax and block out the noise clutter from earlier analyses. What makes this observation the more interesting is that her portfolio return was the lowest in both classes, as was her HCP profile score of 1.1. (Several others in both groups shared that minimal HCP number and their portfolio results were mixed. In fact, one of them had the *highest* return in the control group. So I don't mean to overstate this problem. Still, I think the procedures can and should be improved.)

- On a related note, I would consider mandating a single, uniform relaxation technique such as meditation. It is interesting—and perhaps significant—that none of the test group members opted for this or for self-hypnosis, the two techniques specifically recommended by Loye.

- Finally, I would make the instructions clearer. This doesn't mean, however, that I would rewrite them (except as revised procedures warranted), since they were a model of clarity in the first place. Rather it means that I would come very close to *reading them aloud* to the participants. My biggest surprise in conducting the experiment was in the realization that many advanced undergraduate and MBA graduate students either cannot or will not read and follow a set of instructions without a lot of coaching from the sideline. Early in the semester, when most of the participants in both sections began missing deadlines and turning in totally inadequate journals, I had to quickly revise the project's incentive structure. Originally all carrot, it became mostly stick, with "points off" penalties for various kinds of infractions. Understandably, this took a lot of the fun out of the experiment for everyone. In darker moments, I even found myself thinking that I would never again use students as research test participants! (In the light of day, of course, I know that this isn't an option. It does no good to use perfect, highly motivated test participants to find out hemispheric consensus works, unless we can teach the technique to students.)

Educational Importance of the Study

If psychologist Loye is correct, the success of a few better-than-average money managers could stem as much from their making better-than-average use of their brains' forecasting abilities as from the existence *per se* of any market inefficiencies. Even in an EMH world, some stocks will outperform others and decision timing will always be a critical issue. As business and finance educators who care about improving our students' decision-making skills, we owe it to them to explore fully the possible benefits of brain hemispheric consensus. This study is one small step in that direction.

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Appendix A

HCP PROFILE

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NAME_____ DATE_____

This is an experimental test of thinking styles. It will take about three minutes of your time. Please circle the ONE number for the answer that best fits you.

1. In grade and high school, were you best in: *math*, 1. Or *art*, 2.

2. In grade and high school, were you best in: *languages*, 1. Or *crafts*, 2.

3. Do you tend to get at solutions to problems by: *analyzing them step by step*, 1. Or by *getting a "feel" for the solution all of a sudden, as a whole*, 2.

4. In regard to your work or personal life, do you follow hunches only if they are supported by logic? *Yes*, 1. *No*, 2.

5. In regard to your work or personal life, do you follow hunches if they may not seem logical but have the right "feel"? *No*, 1. *Yes*, 2.

6. Have you ever known before being told if some member of your immediate family or a close friend is in serious trouble or ill? *No*, 1. *Yes*, 2.

7. In drawing pictures, plans, or maps, how would you rate your sense of distances, directions, and how things relate to one another? *Pretty good*, 2. *Not so good*, 1.

8. When you work on projects, do you *most* want them to be: *well planned*, 1. Or *designed to contribute something new*, 2.

9. In dealing with problems, which gives you the most satisfaction: *solving it by thinking it through*, 1. Or *tying fascinating ideas together*, 2.

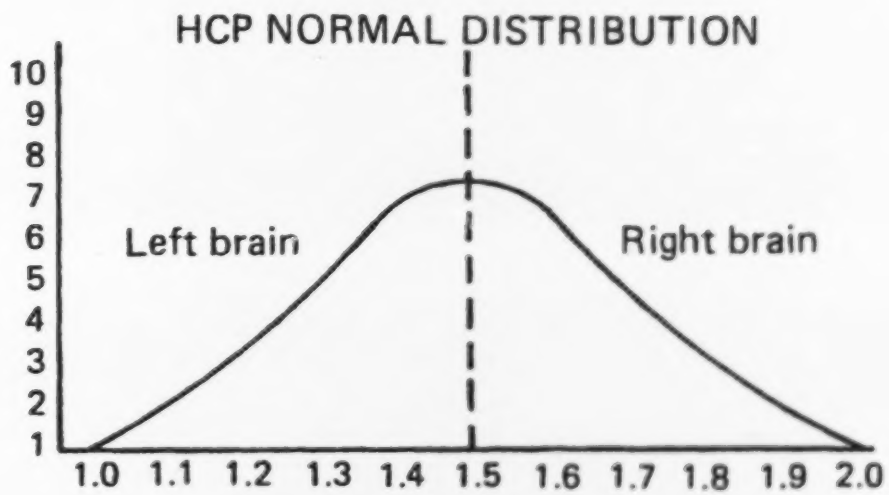
10. Do you experience hunches about future events that prove to be correct? *Yes*, 2. *No*, 1.

Appendix B

Name_____

Class_____

Your HCP Profile score is plotted on the distribution below:



Source: Loye, David. *The Sphinx and the Rainbow*. New York: toExcel, 1998.

To score the HCP Profile, add up the response numbers and divide the sum by 10. A score in the range 1.0 to 1.4 suggests a person is highly likely to be left-brain dominant. Scores between 1.6 and 2.0 indicate a strong likelihood of right-brain dominance. And a score of 1.5 depicts someone who is probably fairly evenly balanced in terms of brain hemispheric use.

Functional differences between the two halves of the brain are quite complex. But for simplicity, it is useful to think of the left hemisphere as the logical, rational half and the right hemisphere as the more intuitive side. The left brain processes information in a straightforward, linear fashion, while the right brain handles inputs as gestalts or patterned wholes. Another way of putting this is that the right brain sees the forest and the left brain the individual trees.

Strong differences in hemispheric orientation can affect such things as our career choices, interests, and hobbies. However, neither type of brain dominance is inherently "better" or "worse" than the other. In fact, the two hemispheres regularly communicate with each other through a connecting area of the brain called the corpus collosum. In this way, they work together in a kind of partnership that in effect elevates two different types of consciousness into a single higher consciousness (Loye, 1998).